

Type in the U. S. National Herbarium no. 1645232, collected in "Rizière argilo-calcaire abandonnée, Village de Van Huan, Province de Quang Binh, Annam" Indo-China, February 26, 1936, by A. Petelot (no. 5634).

The large membranaceous staminate floret and the small indurate pistillate floret borne on an exceptionally long rachilla joint are characteristic.

At maturity the glumes and the pistillate floret fall off leaving the staminate floret and the rachilla joint attached to the pedicel.

ZOOLOGY.—*Bryozoa collected in the American Arctic by Captain R. A. Bartlett.*¹ RAYMOND C. OSBURN, Ohio State University. (Communicated by WALDO L. SCHMITT.)

The collections made by Captain Robert A. Bartlett over many years in the Arctic have added much to our knowledge of the occurrence and distribution of the various forms of life. Recently the United States National Museum sent to the writer for determination the Bryozoa from seventeen collecting stations ranging from Hudson and Davis Straits to northwest Greenland. Seven of these were taken by the Norcross-Bartlett Expedition in 1933. The others are scattered collections dated 1926, 1927, 1932 and 1935.

While the Bryozoa are thus apparently incidental collections, they serve to indicate the richness of the fauna in this group in these Arctic waters. A number of the species have not been listed hitherto in the waters west of Greenland and the range of other species is extended.

Perhaps the most characteristic species is the well known *Microporina borealis* (Busk) which occurred at eleven of the stations, in bushy masses reaching a height of four to as much as six inches. It appears to afford a favorite lodging place for many other bryozoan species. In a half pint jar of *M. borealis* taken near Dalrymple Rock, Wolstenholm Sound, N. Greenland, there were found the following 23 species encrusting or attached to the stems:

Gemellaria loricata (L.), *Scrupocellaria scabra* (v. Ben.), *Dendrobeatia murrayana* var. *fruticosa* (Packard), *Electra crustulenta* var. *arctica* Borg, *Callopora craticula* (Alder), *C. lineata* (L.), *Tegella unicornis* (Fleming), *T. armifera* (Hincks), *Cauloramphus cymbaeformis* (Hincks), *Hippothoa hyalina* (L.), *Harmeria scutulata* (Busk), *Myriozoella plana* (Dawson), *Hippodiplosia reticulopunctata* (Hincks), *H. porifera* (Smitt), *Rhamphostomella ovata* (Smitt), *R. costata* Lorenz, *R. plicata* (Smitt), *R. scabra* (Fabr.), *R. spinigera* Lorenz, *Smittina arctica* (Norman), *Costazia ventricosa* (Lorenz), *Lichenopora verrucaria* (Fabr.), and *Crisia* sp.

The localities are listed below and these will be referred to under the various species by the numbers indicated in the list.

¹ Received October 9, 1936.

1. Off Dalrymple Rock, Wolstenholm Sound, N. Greenland, July 22, 1926.
2. Murchison Sound, N. Greenland, August 20, 1926.
3. 66° 30' N., 80° W., August 10, 1927.
4. Five miles S. of Cape Chalon, N. Greenland, July 27, 1932.
5. Three miles S. of Salisbury I., Hudson Str., 20 Fath., July 25, 1933.
6. W. end of White I., Frozen Str., Fox Channel, August 10, 1933.
7. Hurd Channel, between Bushman I. and Melville Pen., Fox Channel, August 17, 1933.
8. Cove No. 40, N. shore of Lyon Inlet, Melville Pen., Fox Channel, August 24, 1933.
9. Cove No. 50, N. shore of Lyon Inlet, Melville Pen., Fox Channel, August 25, 1933.
10. Entrance to Fury and Hecla Str., 20–30 Fath., Sept. 3, 1933.
11. N. E. entrance to Fury and Hecla Str., Sept. 5, 1933.
12. Hakluyt I., Whale Sound, 77° 26' N., 72° 30' W., 68–120 feet, July 30, 1935.
13. E. end of Cobourg I., Baffin Bay, 75° 40' N., 78° 40' W., 140–210 feet, August 3, 1935.
14. The same, but 75° 40' N., 78° 50' W., 140–210 feet, August 3, 1935.
15. The same, but 75° 40' N., 78° 53' W., August 3, 1935.
16. The same, but 75° 40' N., 78° 55' W., 150–280 feet, August 3, 1935.
17. S. end of Cobourg I., 75° 40' N., 78° 58' W., 40–80 feet, August 4, 1935.

Altogether 60 species occur in these collections, six of which have not previously been reported for this part of the American Arctic. These species are *Crisia cribraria* Stimpson, *Diaperoecia harmeri* Osburn, *Plagioecia (Mesenteripora) grimaldii* (Jullien and Calvet), *Flustrella corniculata* (Smitt), *Electra crustulenta* var. *arctica* Borg, and *Bugula simpliciformis* Osburn. (For the waters about Greenland and westward see the compiled lists by Osburn, 1919, and 1923, and Nordgaard,—Second Fram Exped., 1906.)

Crisia cribraria Stimpson has been noted only on the American coast from Cape Cod to Labrador; *Diaperoecia harmeri* Osburn from Maine to Nova Scotia, *Flustrella corniculata* (Smitt) is an Arctic species reported from Norway, Spitzbergen and Alaska (the present record fills a large gap in the known distribution). *Bugula simpliciformis* Osburn has been recorded only from Hudson Bay. *Plagioecia grimaldii* (Jullien and Calvet) was described from the Grand Banks of Newfoundland.

Thirty-eight species of the present list were recorded by Nordgaard (1906) in the waters west of Greenland.

In the following list of species taken by Capt. Bartlett, localities are given, for the sake of brevity, in station numbers which may be referred to above.

ENDOPROCTA.—*Barentsia* sp. 15. One young specimen, too small for identification.

CYCLOSTOMATA.—*Crisia cribraria* Stimpson. 6, 9. Well developed colonies, with ovicells. Hitherto this species has been known only from Cape Cod northward to Nova Scotia.

Crisia sp. 9. Probably *C. denticulata* (Lamarek), but without ovicells and too young for positive identification.

Diaperoecia (*Entalophora*) *harmeri* Osburn. 6, 9. This species was described and listed by Osburn (1933, p. 301) from Georges Bank to Nova Scotia. It is not surprising to find it in Arctic waters where it may have been noted previously as a species of *Entalophora*.

Diplosolen (*Diastopora*) *obelium* (Johnston). 9. Widely distributed in temperate and colder waters.

Oncousoecia (*Diastopora*) *diastoporides* (Norman). 13. Widely distributed in northern waters.

Plagioecia (*Mesenteripora*) *grimaldii* (Jullien and Calvet). 13, 14, 15. In each case a single, stipitate, folded colony with ovicells. The ovicells resemble those of *Tubulipora patina*, but are less transverse than those illustrated. Many of the zooecial tubes are closed, with the closing membrane smooth or perforated or frequently with the small central tubules common in *sarniensis* and some other cyclostomes. The species may prove to be *patina*, but the differences seem to be sufficient to separate it.

Tubulipora flabellaris (Fabricius). 12. Widely distributed in temperate and northern waters.

Lichenopora verrucaria (Fabricius). 4, 6, 9, 11, 12, 13, 14, 17.

CTENOSTOMATA.—*Alcyonidium disciforme* Smitt. 8. The largest representative of this species previously reported was but 17 mm in diameter. Two of three specimens picked up between tides along the north shore of the cove (8) measured respectively 28 and 34 mm in diameter. These disc-like colonial forms were centrally perforate, a condition which seems to have been noticed only once before in scientific literature (Levinsen, Bryozoa fra Kara Havet, 1886, pl. 27, fig. 13). The openings may indicate that this bryozoan at times grows around a stalk of some sort. The only other specimens that I have seen of this species were several of much smaller size, 12 mm in diameter, and without the central holes. They were found attached to stones and algae in Wakeham Bay, Ungava, at very low tide, October, 1927.

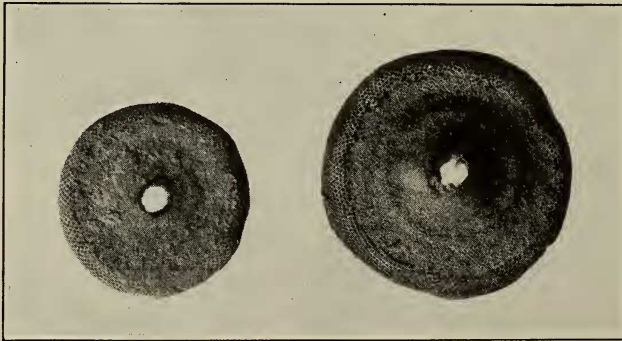


Fig. 1.—*Alcyonidium disciforme*, nat. size. Two specimens of the rarely found perforate form. The largest previously known specimen was about two-thirds of the size of the smaller one figured here.

Bowerbankia gracilis Leidy. 2. *B. caudata* (Hincks) and *Farella arctica* Busk, both recorded for Arctic waters, are probably synonymous.

Flustrella corniculata (Smitt). 8, 9. Previously known from Norway and Spitzbergen, and from Alaska (*Alcyonidium cervicornis* Robertson). The present record, which is the first from the American Archipelago, fills a large gap in the circumpolar distribution of the species.

CHEILOSTOMATA.—*Gemellaria loricata* (Linnaeus). 1, 4, 9.

Membranipora serullata (Busk). 9, 10, 13, 14. Rather abundant at these stations and occurring in both the encrusting, unilaminar, and the flustrine condition as narrow irregular fronds.

Electra crustulenta (Pallas) var. *arctica* Borg. 1, 12, on shell and pebbles. Dr. Folke Borg (1931) has made a careful analysis of several much confused species of the old genus *Membranipora*,—*membranacea*, *reticulum*, *lacroixii*, *crustulenta*, *mülleri*, *monostachys* and *catenularia*. It is very difficult to state the distribution of these species, due to misidentification by even the best workers of the past. It is certain however, that the present species is Borg's var. *arctica*, since it has the well calcified operculum.

Callopora craticula (Alder). 1, 6.

Callopora lineata (Linnaeus). 1, 6, 12.

Callopora spitzbergensis (Bidenkap). 4, 12.

Callopora spathulifera (Smitt). 6, 9, 10.

Tegella arctica (d'Orbigny). 12. Several colonies, one more than an inch across, on a pebble.

Tegella unicornis (Fleming). 1, 4, 6, 12.

Tegella unicornis var. *armifera* (Hincks). 1, 2, 12.

Cauloramphus cymbaeformis (Hincks). 1, 2.

Scrupocellaria scabra (van Beneden). 1, 12, 14, 17.

Tricellaria (*Menipea*) *ternata* (Solander). 3, 8, 9, 13. Mostly of the var. *gracilis* (Smitt).

Tricellaria (*Bugulopsis*) *peachi* (Busk). 4, 10.

Bugula simpliciformis Osburn. 10, 14. There is some doubt about the specimen from Sta. 10 as it lacks both avicularia and ovicells, but the other characters agree well with the type. This species was described (Osburn, 1932, p. 369) from Hudson Bay. All the colonies seen thus far have been small, less than an inch in height, with simple zooecial and zoarial characters.

Dendrobeatia murrayana var. *fruticosa* (Packard). 1, 4, 6.

Microporina borealis (Busk). 1, 2, 5, 7, 9, 10, 12, 13, 14, 17. The most abundant and generally distributed species in the collection and harboring most of the other species noted.

Cribrilina annulata (Fabricius). 4, 6, 12.

Hippothoa hyalina (Linnaeus). 1, 2, 4, 6, 9, 10, 12. Encrusting algae, bryozoa and pebbles.

Harmeria scutulata (Busk). 1, 6, 12.

Cylindroporella tubulosa (Norman). 12. Encrusting pebbles.

Posterula sarsi (Smitt). 10, 14. Fine examples of the erect, branching form.

Stomachetosella (*Lepralia*) *producta* (Packard). 12. One small colony on a pebble. As far as I am aware this species has been recorded only once before in Arctic waters (Kluge, 1907, West Greenland).

Hippodiplosia (*Smittina*) *reticulatopunctata* (Hincks). 1.

Hippodiplosia (*Smittina*) *porifera* (Smitt). 1.

Peristomella jacksoni (Waters). 4.

Microporella ciliata var. *arctica* (Norman). 12.

Mucronella connectens (Ridley) = *Escharella indivisa* Levinsen. 6, 10, 12, 14. On algae and pebbles. In describing this species Levinsen (1916, p. 450) appears to have overlooked Ridley's description of *Mucronella ventricosa* var. *connectens* (1881, p. 451). Ridley misinterpreted the large undivided pore chambers, upon which Levinsen especially based his species, but his figures (Pl. XXI, figs. 6, a and b) show this character almost exactly as figured by Levinsen (Pl. XX, figs. 1 and 2). Ridley states that the broad oral denticle has lateral points, while Levinsen indicates it as straight, but my material shows some variation. The other characters are in agreement. I am therefore returning to the use of Ridley's name.

Smittina arctica (Norman). 13.

Rhamphostomella ovata (Smitt). 1, 6, 10.

Rhamphostomella plicata (Smitt). 1.

Rhamphostomella bilaminata (Hincks). 13.

Rhamphostomella scabra (Fabricius). 1.

Rhamphostomella costata Lorenz. 1, 2, 13.

Rhamphostomella spinigera Lorenz. 1.

The presence of six out of the seven arctic forms of *Rhamphostomella* (*R. radiatula* Hincks is the only one lacking) might appear unusual but for the preference which the species of this genus have for attachment to stems such as those of *Microporina borealis*.

Porella acutirostris Smitt. 10, 12, on algae and pebbles.

Porella compressa (Sowerby). 10. Well-developed, branched colonies.

Porella princeps Norman. 14.

Porella struma var. *glaciata* (Waters). 4. Spreading, foliaceous colonies, sometimes of more than one layer.

Cystisella (*Porella*) *saccata* (Busk). 4, 13.

Cheilopora sincera (Smitt). 13, 14. The *Mucronella praelucida* of Hincks must undoubtedly be considered a synonym of *sincera* Smitt, at least as far as records from eastern North America are concerned. The zooecia in specimens from the Gulf of St. Lawrence, Labrador and Hudson Bay are considerably smaller, but in the present material I find, even within the same colony, zooecia which range from the small St. Lawrence type to even larger than the measurements given by Smitt for Spitzbergen and Finmarken specimens. There appear to be no other distinctive characters.

Retepora elongata Smitt. 10, 13, 14, 15.

Lepraliella contigua (Smitt). 13.

Myriozoum subgracile d'Orbigny. 13, 14, 15, 16.

Myriozoella plana (Dawson) = *crustacea* Smitt. 1, 2, 6, 10, 12, 14, 17. Very common, encrusting algae, the stems of *Microporina* and pebbles.

Costazia (*Cellepora*) *ventricosa* (Lorenz). 1, 7, 10, 14.

Costazia (*Cellepora*) *surcularis* (Packard). 10, 13, 14.

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ENTOMOLOGY.—*A note on the occurrence of a pupal abnormality in the flour beetle Tribolium confusum Duval*.¹ THOMAS PARK, The Johns Hopkins University. (Communicated by RAYMOND PEARL.)

A rather curious pupal abnormality noted among stock cultures of the flour beetle *Tribolium confusum* seems worthy of brief mention. Two pupae were observed which obviously differed from the normal types in having their thorax and abdomen spirally rotated to the right with a corresponding distortion of the longitudinal axis. These relationships can be seen in Fig. 1 where photo-micrographs of normal and abnormal pupae in dorsal and ventral views are presented. In each illustration black lines have been ruled to correspond with the longitudinal axes. For the normal pupa a single, straight line accurately bisects the individual into right and left sides for head, thorax and abdominal regions. In the abnormal pupa it is necessary to draw four distinct lines to describe the axis from the dorsal view and three from the ventral view. Since nothing is known as to the larval history of these two individuals it is impossible to state if the abnormality was acquired early or late in metamorphosis. Likewise, it is impossible to conclude whether the abnormality is merely some developmental accident or whether a more fundamental basis is involved.

Interest was first attracted to these pupae since, in spite of their structure, they appeared very much alive and gave every indication of developing into imaginal forms. All young *Tribolium* pupae when lightly touched on the mid-ventral surface exhibit a marked flexing movement of the abdomen and it is frequently possible to distinguish between living and dead forms in this manner. This reflex was well developed for the two atypic pupae and suggested that, even though they possessed such an unusual external morphology, certain neuromuscular connections had been established at the time which permitted the described behavior to take place.

¹ Received September 17, 1936.